

## **REMARKS**

### **Claim Amendments and Rejections Under 35 USC § 112, and Claim Objections**

In claim 1, in step a), the previously optional fluorine compound gas is no longer optional.

Claim 16-19 are cancelled.

### **The Rejections Under 35 USC § 103**

The claims were rejected as allegedly unpatentable over a) Fujiwara alone or in view of Hiraiwa and in view of Kyoto and optionally Moore and also over b) Hiraiwa in view of Fujiwara and Kyoto and optionally Moore. Since the references in these rejections are the same, these rejections are discussed together.

Fujiwara teaches in example 2, on column 16, lines 5-12, that

The resultant soot body was supplied into a heating furnace and annealed at 1,050° C. in a mixed gas atmosphere of chlorine and helium and then annealed at 1,250° C. in a mixed gas atmosphere of silicon tetrafluoride and helium. This soot body was heated to 1,600° C. and consolidated, thereby obtaining silica glass having a diameter of 70 mm and length of 260 mm.

As can be seen from the above, Fujiwara teaches three distinct heating stages from the point where the soot body is formed until such is consolidated to form silica glass. The first heating stage is at 1,050° C. in a chlorine and helium atmosphere. The second heating stage is at 1,250° C. in a silicon tetrafluoride and helium atmosphere. The third heating stage is at 1,600° C. No gases are taught or suggested for the third heating stage. Thus, one of ordinary skill in the art would not be motivated to perform a step d) of the present claims at 1,500°C to 1,700°C in a fluorine compound gas-containing atmosphere as such is not taught or suggested by the reference.

Nevertheless, the Office Action alleges that “it would have been obvious to sinter the Fujiwara perform in the fluoride atmosphere so as to maximize the amount of fluorine in the glass and/or to reduce the time needed to dope the perform.” There is no basis for these allegations in Fujiwara or in any of the other references. The allegations are mere baseless speculations without support, and thus, are not a proper basis for a rejection under section 103. Nowhere does Fujiwara teach or suggest that it is a goal of the invention therein to “maximize” fluorine content in the glass. Nor is there any teaching in the references that by doping with fluorine in the third heating stage of Fujiwara one would

reduce the time needed to dope the preform.

The Office Action also alleges that “it would have been obvious to just leave the Fujiwara gas in contact with the glass ... to save time and money by not having to remove, purge and replace with other gases.” This allegation also has no basis in the references. Fujiwara teaches a first step and states that the gas atmosphere is chlorine and helium and a second step where the gas atmosphere is silicon tetrafluoride and helium. Clearly, Fujiwara had to remove, purge and/or replace the gas between the first and second steps. No money and/or time issues precluded this. Nor does money and/or time saving for the processes appear to be a concern identified anywhere in the reference with respect to any stage of the process disclosed therein.

The first two heating stages the atmosphere is clearly identified by Fujiwara. Thus, the lack of identifying an atmosphere for the third heating stage would suggest to one of ordinary skill in the art that no special gas-containing atmosphere as taught for the first two stages is present for the third heating stage. Why would Fujiwara specifically identify at each to the other stages the presence of a specific atmosphere, but leave such out for the third heating stage if such an atmosphere was actually present?

Thus, Fujiwara does not teach or suggest the claimed invention.

Hiraiwa as admitted by the Office Action does not teach a step d) of the present claims at all, and thus, does not add anything to the issues discussed above with respect to step d).

Kyoto as alleged teaches a VAD process where fluorine is added in the vitrifying step. However, the Office Action failed to consider the rest of the teachings of this reference, which actually teach away from applicant's claimed invention. Kyoto teaches that when the temperature with  $\text{SiF}_4$  “exceeds  $1,400^\circ\text{C}$ , the bubbles tend to form in the glass perform.” See column 3, lines 63 to column 4, line 1, and Figure 3, which figure was actually also pointed to by the Office Action. Additionally, Examples 1 and 2 in Kyoto teach heating to  $1,100^\circ\text{C}$  with  $\text{SiF}_4$  and Example 3 teaches heating to  $1,350^\circ\text{C}$  with  $\text{SiF}_4$ . Heating to higher temperatures occurs in a Helium atmosphere. See Examples 2 and 3. One of ordinary skill in the art combining Kyoto with Fujiwara would not be motivated to vitrify as claimed herein, i.e., at  $1,500^\circ\text{C}$  to  $1,700^\circ\text{C}$  in a fluorine compound gas-containing atmosphere, especially since Kyoto teaches away from vitrifying at such high temperatures to avoid bubble formation.

Moore is “optionally cited” to teach doping during sintering. Applicants are not sure what is optional about this citation, but nevertheless address the allegations. The Office Action points to Moore page 10, lines 6-15, where Moore generically teaches doping prior to and during consolidation/sintering. The Office Action also points to Example 2, which is directed to an OVD method, where  $\text{CF}_4$  and He are added at  $1,225^\circ\text{C}$ , and sintering at  $1,480^\circ\text{C}$  occurs in the same atmosphere. Contrary to this, the claims herein recite a specific process comprising steps a) through f), where in step d) vitrifying occurs at  $1,500^\circ\text{C}$  to  $1,700^\circ\text{C}$  in a fluorine compound gas-containing atmosphere. The claimed invention herein is not taught or suggested by Moore or by the combination of the references with Moore.

Applicants, although not necessary to overcome the rejections, point to comparative example 1 of the specification where doping occurs during vitrification.


The claims were rejected as allegedly unpatentable over Hiraiwa in view of Fujiwara, Yamagata, and Kyoto and optionally Moore. Except for Yamagata, all these references are discussed above, and such discussions are incorporated herein.

No allegations are made with respect to Yamagata in the Office Action. Applicants assume the allegations from the previous Office Action are maintained without change over this reference. Yamagata is alleged to teach process steps not involving vitrification. Thus, this reference does not cure the deficiencies of the references discussed above.

Reconsideration is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,



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